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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/021,322	12/12/2001	Dong-su Park	29925/37976	6147
4743	7590	05/24/2004	EXAMINER	
MARSHALL, GERSTEIN & BORUN LLP 6300 SEARS TOWER 233 S. WACKER DRIVE CHICAGO, IL 60606			NGUYEN, DONGHAI D	
			ART UNIT	PAPER NUMBER
			3729	7

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/021,322

Applicant(s)

PARK ET AL.

Examiner

Donghai D. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-9 is/are allowed.
- 6) ☒ Claim(s) 1-4 and 11-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Amendment***

1. The proposed reply filed on December 08, 2003 has been entered as Paper No. 6.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claims 1-4 and 11-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "without performing ... film deposition" (Claim 1, lines 9-10) is vague and indefinite since it is unclear as to what the cleaning process is (i.e., the cleaning process is for cleaning the chamber, the surface of the substrate and/or layer formed on the substrate).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4 and 11-15 as best as understood are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Lee et al (US Pat. 6,340,622).

Regarding claims 1-3 and 15, AAPA (Pages 2-3) discloses the method for manufacturing a capacitor comprising: forming a lower electrode (100) on a surface of a semiconductor substrate; forming Metastable Poly Silicon using gas after performing wet or dry etching of the lower electrode; performing Metastable Poly Silicon doping and depositing a nitride film (102) and a tantalum oxy nitride film (104); performing nitrating the surface of tantalum oxy nitride thin film; and forming an upper electrode (106), wherein the MPS formation, the MPS doping, the nitride depositing and the tantalum oxy nitride film depositing are performed in the chamber (inherence since the process using gas). Using HF for etching the lower electrode (page 2, line 25) except the MPS doping and depositing the nitride film in-situ the chamber; however Lee et al teaches the step of MPS doping and depositing the nitride film in-situ the chamber (Col. 4, lines 13-15) for achieving the improvement in electrical characteristics while ensuring the required capacitance (Abstract last three lines). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify AAPA by MPS doping and depositing the nitride film in-situ the chamber as taught by Lee et al for achieving the improvement in electrical characteristics while ensuring the required capacitance.

Regarding claims 4 and 11-14, AAPA discloses all the steps that recited in claims 4 and 11-14 except the material using in these step; However, Lee discloses the material: the gas comprising HF is selected from the group consisting of hydrogen fluoride/water (HF/H<sub>2</sub>O) (Lee's col. 4, lines 33-35); the chemical vapor comprising tantalum is evaporated tantalum ethylate (Lee's Col. 5, lines 7-17); the tantalum oxy nitride thin film is performed by nitrating the surface under NH<sub>3</sub> (or N<sub>2</sub>/H<sub>2</sub>) atmosphere or nitrifying the surface under N<sub>2</sub>O or O<sub>2</sub> atmosphere (Lee's col. 5, lines 29-33) and at a temperature 200 °C to 600 °C by using plasma (Lee's col. 4,

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lines 13-21); and, the upper electrode is formed by depositing a material selected from the group consisting of poly silicon (Poly Si), titanium nitride (TiN), tantalum nitride (TaN), tungsten (W), tungsten nitride (WN), tungsten silicide (Wsi), ruthenium (RU), ruthenium oxide (RuO.sub.2), iridium (Ir), platinum (Pt), individually or repeatedly to form a stacking structure (Lee's col. 5, lines 45-49) for improving electrical characteristic and ensuring sufficient capacitance for next generation of semiconductor device (Col. 2, lines 31-35). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Applicants' admitted prior art to have all the specific material as taught by Lee et al for improving electrical characteristic and ensuring sufficient capacitance for the capacitor that uses in the next generation of semiconductor device.

*Allowable Subject Matter*

6. Claims 5-9 are allowed.

*Response to Arguments*

7. Applicant's arguments with respect to claims 1-4 and 11-15 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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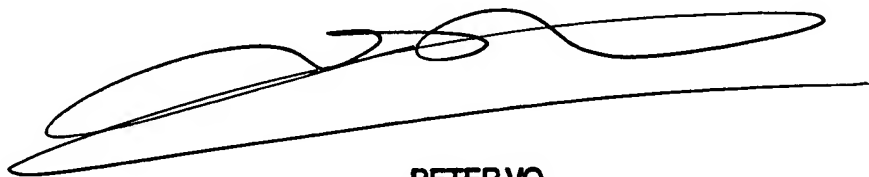
MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghai D. Nguyen whose telephone number is (703) 305-7859. The examiner can normally be reached on Monday-Friday (9:00-6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (703) 308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DN



PETER VO  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700